The skeleton of a science start up

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Talk Content

• About SIRAKOSS
• About Unmet Clinical Need and Use of BGS
• My employment responsibilities
  – UOA
  – SIRAKOSS
• Current status of SIRAKOSS
SIRAKOSS

- University of Aberdeen Spin out company
- Medical Device Company formed in 2010
- Registered Office in Edinburgh
- R&D staff based in Aberdeen
- Technology spun-out in 2011
- Formed to commercialise UoA Intellectual Property
  - Synthetic bone graft substitute (MaxSi™ Graft)
  - Primary use in spinal applications, but also has applications in maxillofacial, trauma, dental markets
Modern life and the requirement for surgical treatment

• Congenital defect
• More active- increased wear and tear
• Extreme sports- stresses and trauma
• Increased life expectancy- bones and joints wear out with time
Spine health in a fast paced society

• Accidents do happen – trauma events
• Lifestyle choices and working habits
• Old age – spine naturally degenerates
Current bone graft options

- **Autograft** - your own bone
  - Painful
  - Secondary operation, increased time and cost
  - Chance of infection
  - Limited supply
- **Allograft** – another persons bone
  - Harvested at the morgue
  - Potential for disease transmission?
  - Inherent variability from donors, pensioner vs youth
- **Bone Morphogenetic Protein**
  - Expensive compound generating high sales ($800m in US in 2011),
  - More recent reports of complications e.g. ectopic bone formation.
  - Initially approved as a device in lumbar spine
- **Synthetic**
  - Reproducible
  - Unlimited supply
  - Lower unit cost – affordability important in current healthcare climate
  - Mixed with blood and/or local autograft
Bone graft applications in spine

• Global bone fusion market valued >$2.5bn

• Many procedures and conditions e.g. spondylolisthesis, scoliosis, herniated disc, disc degenerative disease, trauma event, bone tumour

• Surgeon seeks to correct a defect, repair broken bone or fuse existing bone together
Calcium phosphate synthetic bone graft substitutes

Most current Products

- Hydroxyapatite $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$
  and/or tricalcium phosphate $\text{Ca}_3(\text{PO}_4)_2$
- Highly porous (60-80% porous)
- Pore size (200-1000 μm)
- Surface area (0.5-2 m²/g)
- Slow (HA) or rapid (TCP) solubility
- Osteoconductive properties
**Market Benefits**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Why</th>
<th>Who</th>
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<tbody>
<tr>
<td>High wt.% silicon</td>
<td>Correlation to bone growth</td>
<td>Patient</td>
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<tr>
<td>Granule structure</td>
<td>Rapidly forms a palpable mass</td>
<td>Surgeon; Hospital</td>
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<tr>
<td></td>
<td>ready for use</td>
<td>Patient; Hospital</td>
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<tr>
<td>High surface area</td>
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<td>Fast blood absorption</td>
<td>Reduce operating time</td>
<td>Surgeon</td>
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<td></td>
<td>Reduce anaesthesia time</td>
<td>Patient</td>
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<tr>
<td>Improved bone fusion</td>
<td>Surgeon reassurance</td>
<td></td>
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<td></td>
<td>Reduced patient morbidity</td>
<td>Patient</td>
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<tr>
<td></td>
<td>Earlier return to full activity</td>
<td>Insurer, State</td>
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MaxSi™ Graft

The Solution

SIRAKOSS

Synthetic
Controllable
Bone Formation
Confidentiality

• Exciting data from a range of studies conducted
  – No publications
    o Frustration for academics
    o Limited collaboration
• Patent Portfolio – expanding
• Lots of trade secrets/ know-how
Research leading to SIRAKOSS

- 2005 EPSRC Advanced Research Fellowship grant – Prof Iain Gibson
- 2007 Scottish Enterprise Proof of Concept Funding awarded to UoA
University of Aberdeen

• 2007-2010 RA in Chemistry Dept.
  – Refine the composition and reaction methods
  – Produce and bench test samples, XRF, XRD, ICP-OES, FTIR, MIP, BET, SEM
  – Meet with end users
  – Demonstrate repeatability in synthesis
  – Demonstrate a level of safety and efficacy, PCS
  – File IP e.g. patent, know-how, trademarks
  – Assess feasibility of commercialising the IP
    • Project change of direction based on market assessment information
Post PoC Funding- Major decisions

• Great idea- but what next?
  – Form a company, licence technology, sit back?
  – Stay in academia or take a gamble?

• Where to turn
  – University Research and Innovation
  – SE Commercial advisor
  – Colleagues

• Formulate a business plan
  – Commercial advisors
  – Interim CEO
Company Financing

➢ Founders investment
➢ FFF Round
➢ Grants e.g. Scottish Enterprise (SMART) = £30k own money matched with £70k
➢ Seed Fund Round
➢ Series – A
  • Angel Group
  • Venture Capitalist
    » Advance technology – add value, milestones
    » Grow company- new staff, equipment, data
    » Give something back
Day 1- All alone

- No email address
- No phone or IT support
- Premises – Incubator Units
- Chemicals – No University discount
- Analysis – No discount, access charges
- Purchasing documentation
- Expense forms
- Time sheets
Current status after 4 years

- Growing company
  - Directors
  - Consultants
  - Employees
- New research facilities at Polwarth
- Edinburgh Office
- Managing suppliers EU, US
- Outsource manufacturing
- Design Dossier/Technical file
- Toxicology studies
- Write protocols and manage test facilities
What about me?

• Director (4 years), Shareholder, Inventor and Employee of SIRAKOSS (R&D Manager)

• Chemist
  – Patent Applications
  – New formulations, further applications

• Industrial Fellowship award holder- Royal Commission for the Exhibition of 1851
  – Bridge between academia and industry
  – **Mission** “increase the means of industrial education and extend the influence of science and art upon productive industry”
  – Provide salary support, plus university fees paid, £10,000 honorarium to University, plus £3500 travel p.a.
ApaTech Ltd

- Queen Mary University London spin out
- Prof Iain Gibson a scientific founder
- Silicated Hydroxyapatite material
- Incorporated in 2001
- July 2001 Series A Funding: £3m
- March 2010 Exit trade sale to Baxter International for $330m

Progentix BV

- Twente University
- Incorporated 2007
- Jan 2008 Funding stage: €1m
  - 510k filed Mar 2009 (CuriOs*)
  - granted Oct 2009
- Jan 2009 Investment by Nu-Vasive
  ➢ $10m for 40% ($25m valuation)
  + $5m loan + $45m + $25m milestones
  staged exit

Proof it can be done
Thank you
• Want to work for us?
• Want to start your own company?
• Would you do it?

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